Claim 1 recites a method of creating a generic text summary of a document comprising the steps of: creating a weighted document term-frequency vector for the document; for each sentence in the document, creating a weighted sentence term-frequency vector; and computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector. However, Billheimer fails to teach or suggest these features.

Fig. 1 is the flow chart of the method of the first embodiment in the present application. As shown, at step 102, a weighted term-frequency vector A_i is created for each sentence $i \in S$, and a weighted term-frequency vector D is created for the document. At step 103, a relevance score between A_i and D is computed for each sentence $i \in S$.

However, Billheimer only teaches a term-frequency matrix A defined from a set of documents. Each entry in A is the raw frequency of a term in a given document, i.e., A_{ij} is the number of times a term t_i occurs in a D_j (Billheimer, col. 11, lines 2-11). The text mining operation (step 118 of Fig. 3 of Billheimer), the re-indexing operation (step 112 of Fig. 3 of Billheimer), and the update indexing operation (step 118 of Fig. 3 of Billheimer) are all based on the term-frequency matrix A.

The Examiner has asserted that Billheimer teaches creating a weighted sentence term-frequency vector, referring to col. 6, line 20-35 of Billheimer. Applicants respectfully disagree. The part referred to by the Examiner is about information retrieval (step 201 in Fig. 8A of Billheimer) and document cross-referencing (step 218 in Fig. 8B of Billheimer), not about creating a generic text summary of a document.

PAGE 3/8 * RCVD AT 12/22/2004 4:00:08 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:650 625 8110 * DURATION (mm-ss):02-18

The Examiner has asserted that Billheimer teaches computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector, referring to col. 17, lines 25-35 of Billheimer. However, the part referred to by the Examiner is about a pictorial representation of a term frequency matrix. As shown in Fig. 15 of Billheimer, each column of the matrix represents a document in a document collection, and each row represents a term found in one or more of the documents. For each entry, the raw number of occurrences of the term for the given row for the document is displayed (Billheimer, col. 17, lines 25-30). For example, the term "apache" occurs 15 times in a Document A, 10 times in a Document C, 12 times in a Document E, and 0 time in Documents B, D, and F. Thus, the part referred to by the Examiner only teaches term frequency matrix of a document. It has nothing to do with weighted sentence term-frequency vector, or computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector.

Thus, although Billheimer teaches computing a score for a vector, the vector is a query vector, not a weighted sentence term-frequency vector, and so Applicants submit that Billheimer fails to teach or suggest computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector.

In addition, although Billheimer shows calculation of relative value for the number of occurrences in Fig. 16, but the relative value is still about the document, not a sentence. For example, in the Document A, the term "Apache" occurs 15 times, and the term "Rotorcraft" occurs 25 times. In Fig. 16, the relative value for the number of occurrences for the term

PAGE 4/8 * RCVD AT 12/22/2004 4:00:08 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:650 625 8110 * DURATION (mm-ss):02-18

"Apache" is 15/(15+25) = 0.375, and the relative value for the term "Rotorcraft" is 25/(15+25) = 0.625.

Accordingly, Billheimer fails to teach or suggest at least three of the four steps of the method recited in claim 1. Accordingly, Applicants submit that claim 1 and its dependencies are patentable.

Herz provides a system for customized electronic identification of desirable objects using a method for accurately and efficiently matching users and target objects by automatically calculating, using and updating profile information that describes both the user's interests and the target object's characteristics. The system automatically constructs both a "target profile" for each target object in the electronic media as well as a "target profile interest summary" for each user describing the user's interest level in various types of target objects (Herz, Abstract). The target profile could be based on the frequency with which each word appears in an article relative to its overall frequency of use in all articles (Herz, Abstract), or on various descriptive attributes of the target object (Herz, col. 7, lines 2-4). Thus, Herz fails to teach or suggest the recited weighted-sentence term-frequency, and fails to provide the deficiencies of Billheimer. Even if a skilled artisan were to combine Billheimer and Herz, the combination would not result in the claimed invention.

Therefore, Applicants respectfully submit that claim 1 and its dependent claims 2-8 are patentable.

Claim 9 recites a system for creating a generic text summary of a document comprising a vector generator for creating a weighted document term-frequency vector for the document and

PAGE 5/8 * RCVD AT 12/22/2004 4:00:08 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:650 625 8110 * DURATION (mm-ss):02-18

creating a weighted sentence term-frequency vector for each sentence in the document; and a scoring engine for computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector. Thus, claim 9 and its dependent claims 10-12 are patentable for at least the same reasons that claims 1-8 are patentable.

Claim 13 recites a method of creating a generic text summary of a document comprising the steps of creating a weighted sentence term-frequency vector for each of individual sentences in a candidate sentence set; creating a weighted document term-frequency vector for the document; and for each of the individual sentences in the candidate sentence set, computing a relevance score for the weighted sentence term-frequency vector relative to the weighted document term-frequency vector. Thus, Applicants submit that claim 13 and its dependent claims 14-20 are patentable for at least the same reasons that claims 1-12 are patentable.

Claim 21 recites a method of creating a generic text summary of a document comprising the steps of: constructing a terms-by-sentences matrix for a document; and performing singular value decomposition on the terms-by-sentences matrix to obtain a singular value matrix and a right singular vector matrix, wherein each sentence in the document is represented by a column vector of a transpose of the right singular vector matrix. As discussed above, Billheimer only teaches a term-frequency matrix A, each entry of which is the frequency of a term in the given document; and Herz only teaches basing a target profile on the frequency with which each word appears in an article relative to its overall frequency of use in all articles. None of the cited references teaches or suggests the recited terms-by-sentences matrix.

PAGE 6/8 * RCVD AT 12/22/2004 4:00:08 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:650 625 8110 * DURATION (mm-ss):02-18

The Examiner has agreed that Billheimer fails to teach or suggest constructing a terms-by-sentences matrix for the document, and performing singular value decomposition on the terms-by-sentences matrix, but has asserted the Herz provides the features, referring to col. 16, lines 40-65 of Herz. Applicants respectfully disagree.

The part of Herz referred to by the Examiner discusses a general approach to recognizing synonyms, using a measure of distances between textual attribute vectors V and U, namely arccos $(AV(AU)^t/\text{sqrt}\,(AV(AV)^t\,AU(AU)^t)$, where the matrix A is the dimensionality-reducing linear transformation determined by collecting the vector values of the textual attribute, for all target objects known to the system, and applying singular value decomposition to the resulting collection. It appears that the Examiner is asserting that the collection of the vector values of the textual attribute, for all target objects known to the system, teaches the terms-by-sentences matrix. However, as defined in col. 4 of Herz, a "target object" is an object available for access by the user, which may be either physical or electronic in nature. There is nothing in Herz to teach or suggest that the collection of the vector values of the textual attribute for all target objects known to the system is a terms-by-sentences matrix. In addition, the purpose of Herz is to locate target objects from a vast amount of on-line information for users with particular interests. As a result, Applicants do not fully understand the Examiner's reasons for relying on Herz, as there is no reason to construct a terms-by-sentences matrix in Herz.

Pursuant to the foregoing, Applicants submit that claims 21 -25 are patentable, and claims 26-28 and 29-32 are patentable for the same reasons.

PAGE 7/8 * RCVD AT 12/22/2004 4:00:08 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:650 625 8110 * DURATION (mm-ss):02-18

Attorney Docket No. CA1122
PATENT APPLICATION

RESPONSE UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/817,591

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Frank L. Bernstein
Registration No. 31,484

SUGHRUE MION, PLLC
Telephone: (650) 625-8100
Facsimile: (650) 625-8110

MOUNTAIN VIEW OFFICE
23493
CUSTOMER NUMBER

Date: December 22, 2004

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this RESPONSE UNDER 37 C.F.R. § 1.111 is being facsimile transmitted to the U.S. Patent and Trademark Office this 22nd day of December, 2004.

Thea K. Wagner

PAGE 8/8 * RCVD AT 12/22/2004 4:00:08 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:650 625 8110 * DURATION (mm-ss):02-18 P.08